Cloud Droplet Characterization System for Unmanned Aircraft, Phase II Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)

ABSTRACT

Atmospheric clouds have strong impact on the global radiative budget. Cloud's radiative properties are strongly affected by droplet size distribution and number concentration. This SBIR project will develop an innovative, compact and inexpensive droplet measurement system (DMS), which will provide in situ measurement of droplet size distribution function and droplet number concentration in clouds. The DMS will be designed to meet the demanding requirements for deployment on small unmanned aerial research platforms including balloons, blimps and small UAVs. The Phase I study demonstrated the feasibility of the proposed method, identified the engineering challenges to be addressed in Phase II and outlined the strategy for further development of the technology. In Phase II a flight-ready compact, lightweight and low-power prototype system will be designed, constructed and field-tested. The Phase II development will provide a solid basis for further commercialization of the proposed technology.

ANTICIPATED BENEFITS

To NASA funded missions:

Potential NASA Commercial Applications: The proposed DMS technology will address the NASA's need to add in situ cloud measurement capabilities to small unmanned aerial research platforms such as balloons, blimps and small UAVs. Deployment of the DMS implemented as a compact and lightweight economic package on small aerial platforms will result in reduced costs and improved coverage of the NASA's atmospheric measurement campaigns. Precise and extensive cloud characterization data will lead to better understanding of the contribution of atmospheric clouds to Earth's radiative budget and climate change. Other potential applications include characterization of atmospheric aerosols, particulate matter in volcanic ash plumes and fuel sprays.

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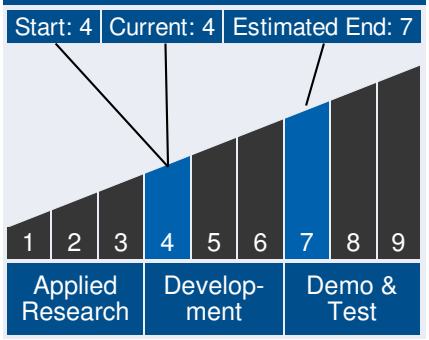
Technology Maturity



Management Team

Program Executives:

- Joseph Grant
- Laguduva Kubendran

Program Manager:

- Carlos Torrez

Continued on following page.

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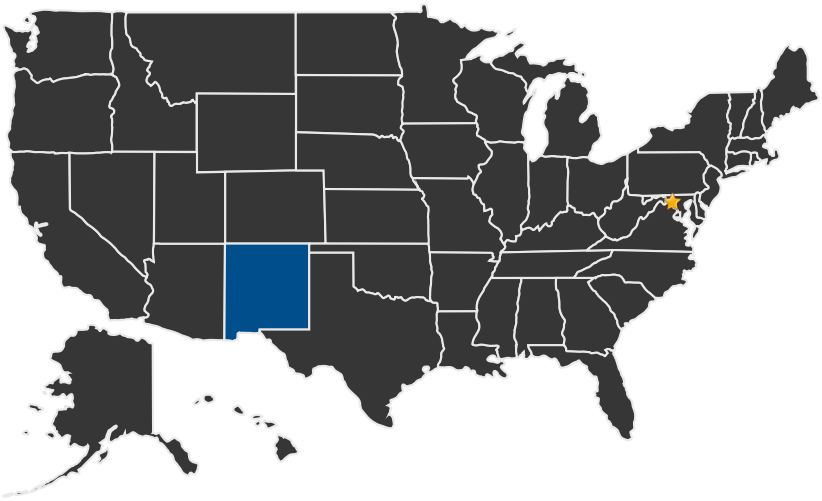
To the commercial space industry:

Potential Non-NASA Commercial Applications: The proposed DMS will be of interest to research institutions and government agencies involved in atmospheric measurements. Flexibility and low cost of the proposed technology will make it compatible with a variety of airborne and ground based platforms and suitable for other applications such as characterization of atmospheric aerosols, volcanic ash plumes and industrial/agricultural sprays.

U.S. WORK LOCATIONS AND KEY PARTNERS



U.S. States With Work

Lead Center:
Goddard Space Flight Center

Other Organizations Performing Work:

- Mesa Photonics, LLC (Santa Fe, NM)

PROJECT LIBRARY

Presentations

- Briefing Chart
  - (http://techport.nasa.gov:80/file/23203)

Management Team *(cont.)*

Principal Investigator:

- Andrei Vakhtin

Technology Areas

Primary Technology Area:
Science Instruments, Observatories, and Sensor Systems (TA 8)
└ In-Situ Instruments and Sensors (TA 8.3)
  └ In-Situ (other) (TA 8.3.3)

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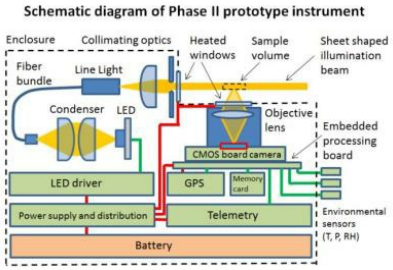
IMAGE GALLERY



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DETAILS FOR TECHNOLOGY 1

Technology Title

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Potential Applications

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